(12) UK Patent Application (19) GB (11) 2 174 472 A

(43) Application published 5 Nov 1986

(21) Application No 8607487

(22) Date of filing 26 Mar 1986

(30) Priority data

(31) 80171 (32) 27 Mar 1985 (33) PT

(71) Applicant
Carlos Joaquim Costa Martins de Oliveira, Estrada da Luz, No 232-11° Dt°, Lisboa, Portugal

(72) Inventor
Carlos Joaquim Costa Martins de Oliveira

(74) Agent and/or Address for Service
Keith W. Nash & Co., Pearl Assurance House, 90-92 Regent Street, Cambridge CB2 1DP

(51) INT CL⁴
F16L 9/22

(52) Domestic classification (Edition H):
F2P 1B1 1B2 1B5B 1B7C 1B7J C10 C14 F23
U1S 1004 1711 1729 1747 1884 1885 1886 2067 F2P

(56) Documents cited

GB A 2087456	GB 0864973
GB A 2000243	GB 0784158
GB 1597534	GB 0694578
GB 1536500	GB 0571714
GB 1085262	GB 0505013
GB 1068295	EP 0071586

(58) Field of search
F2P

(54) Pipe with longitudinal joints

(57) A pipe, duct, culvert or building is made from prefabricated sections each of which extends thereabout for less than its circumference, so that there are longitudinal joints between the adjacent sections. Adjacent sections may meet, or may be held spaced apart by connection blocks 7, 8. The sections may have shelves or supports eg. for cables.

Preferably sections on either side are offset, so that circumferential joints do not extend continuously thereabout (Figure 10, not shown).

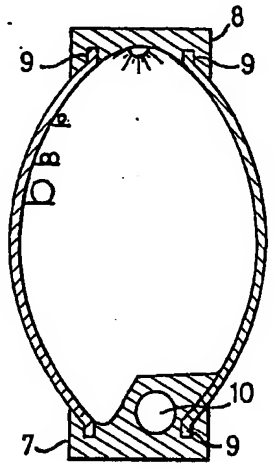

Fig. 4

GB 2 174 472 A

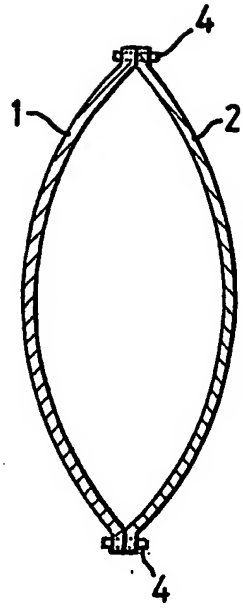

Fig.1

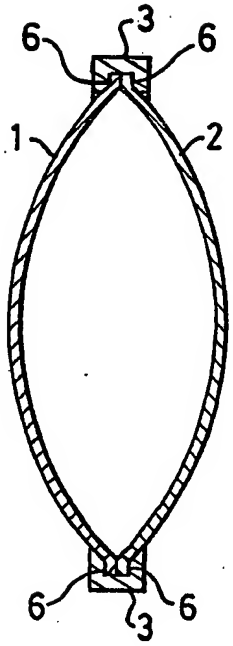

Fig.2

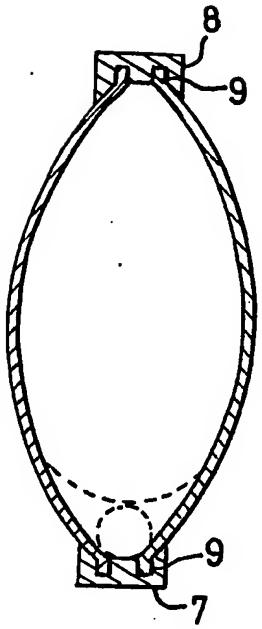

Fig.3

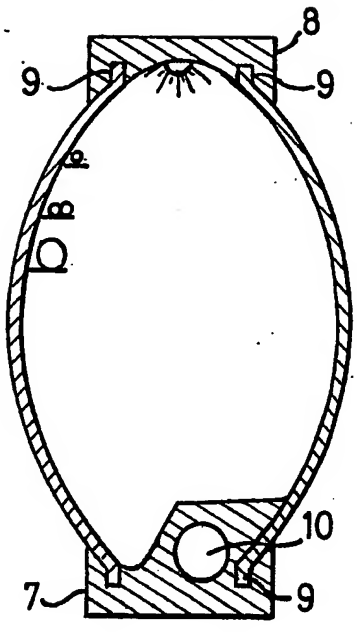

Fig. 4

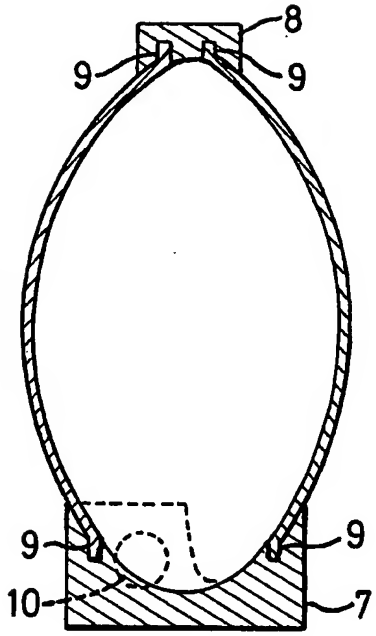

Fig. 5

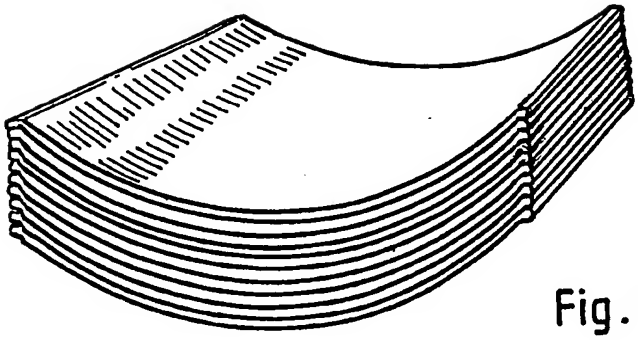

Fig.6

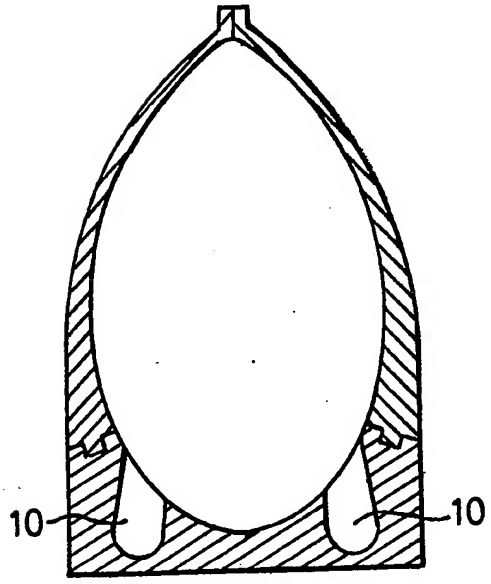

Fig.7

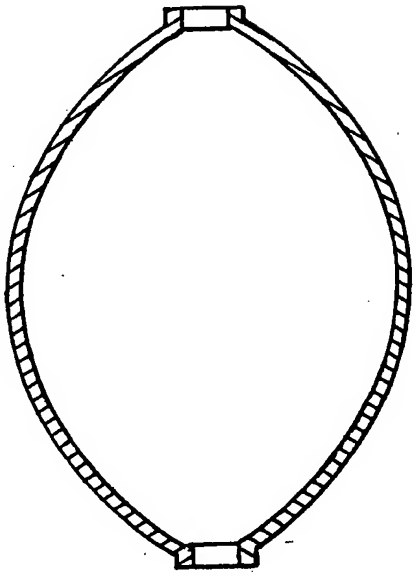

Fig.8

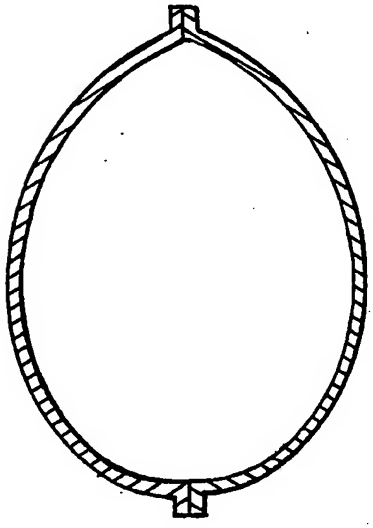

Fig.9

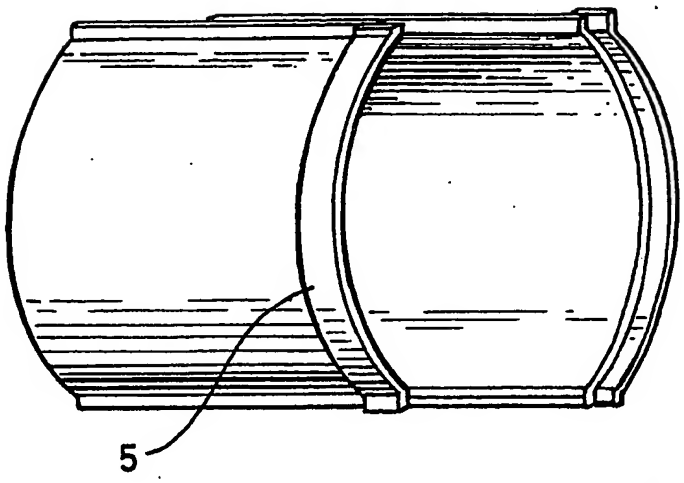

Fig.10

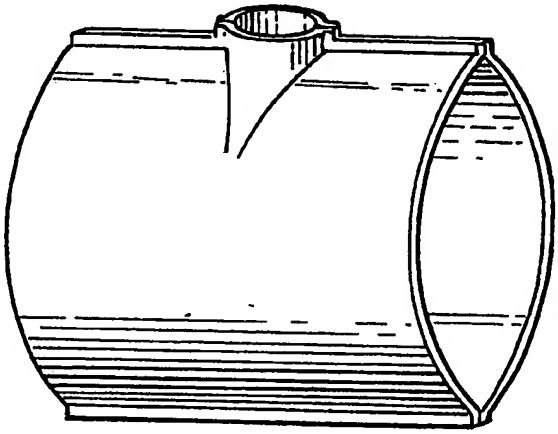

Fig.11

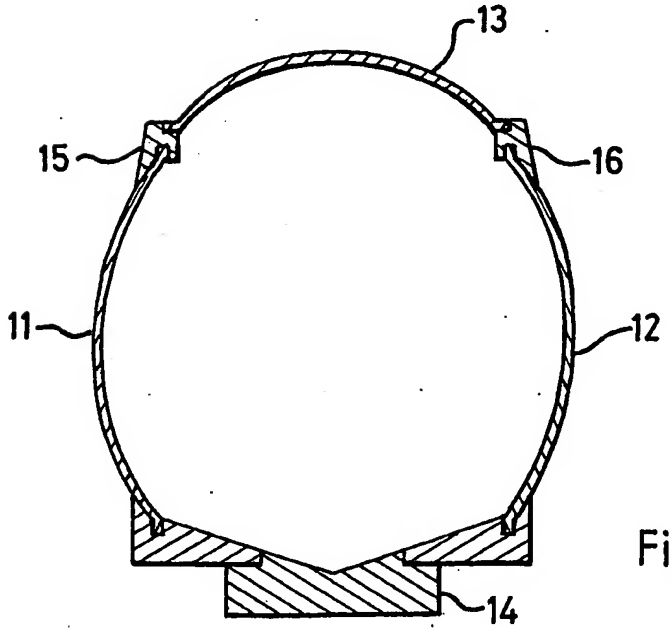

Fig.12

SPECIFICATION

Pipe with longitudinal joints

Field of invention

The present invention relates to pipes and pipe components. Typically its applications will be as follows:

- Drain pipes for domestic or industrial waterflow, or rainfall drainage;
- Surface or underwater drainage systems;
- Conduits for technical installations in a town substructure for water, electricity, telephones, TV cables, computer networks and admittance to sewerage networks, or for pipeline installations;
- Culverts crossing under roads or railways;
- Channels for drainage on free surface;
- Admittance or linking ways for basements of buildings, underground transport systems or underground buildings such as army lodgings.

Background to the invention

Previously drain pipes have been pre-formed in cylindrical elements, of circular or ovoid cross-section. Other types of section are scarcely used except when built 'in situ'.

The pipe diameters currently available on the market are of standardised sizes. As the diameter of a pipe element grows larger the pipes become heavier and more difficult to manufacture, store, transport and assemble.

Generally, all common designs of drainage pipes have petticoat joints to ensure alignment between successive elements. The elements are joined together with mortar or rubber rings. This type of linking requires the petticoats to be very resistant towards high transverse stresses, and requires excavations to be deeper and wider.

The non-accessibility of the great majority of drain pipes leads to the necessity of installing inspection chambers at short distances so that cleaning and unblocking operations can take place.

Roads and railways often have culverts with cross-sections which become inadequate, particularly if there is a change in the soil of the hydrographic basin up the river, or if new town plannings take place. These culverts do not also allow, in most cases, the installation of other substructures such as domestic sewers, water conduits, electricity cables, telephone cables or others.

Summary of the invention

According to the present invention there is provided a pipe formed from longitudinally extending curved-section components, each component extending around part only of the circumference of the pipe, the pipe having longitudinally extending joints or connections between the components.

The components preferably have part-circular cross-sections, eg quarter circles, but the pipes as a whole will typically not have circular cross-sections.

The longitudinal connections between adjacent components may be provided by connection pieces, which may hold the components spaced apart. Thus the components can be prefabricated parts of standard size and shape, while the use of different connection pieces allows pipes of different cross-sectional areas to be made to meet the requirements of any individual application. The connection pieces may be manufactured 'in situ' or may be prefabricated. The cross-sectional area of the pipe may also be varied by varying the number of components around its circumference.

Preferably the components have a perfected profile.

Also preferably the components can be stacked densely, which eases storage and transport.

The components can be manufactured using a variety of materials such as concrete, reinforced concrete, asbestos-cement, PVC, polyester, metals and others.

The pipe can be assembled quickly without subjecting the parts to excessive strain from interlocking.

The finished pipe can be made to be sufficiently big to allow admittance for easy inspection and maintenance, without necessarily having as large a cross-section as a circle of corresponding diameter.

Because the components are manufactured as curved pieces rather than complete pipe elements, the manufacturing machinery can be lighter and simpler and the manufacturing cost can be reduced.

The joints all along the pipe could be water-tight or permeable as desired, without exposing the materials to assembling strains or permanent compression after assembling.

According to the present invention there is also provided a longitudinally extending curved section pipe component, the curved section providing substantially less than a complete pipe circumference.

Embodiments of the present invention given by way of non-limiting example, will now be described with reference to the accompanying drawings, in which:

Figures 1 and *2* represent pipe sections with two different types of longitudinal joints;

Figures 3 and *5* represent pipe sections in which components are connected by bottom and top slabs with various widths and shapes;

Figure 4 represents a pipe section usable as a conduit for utilities, cables etc;

Figure 6 shows in perspective a stack of pipe components;

Figures 7, 8 and *9* show other shapes of pipe components;

Figure 10 shows a transverse joint in perspective;

Figure 11 shows in perspective a pipe with an inspection chamber or man-hole; and

Figure 12 represents another drain construction with a wider cross-section.

A pipe is formed from wall segments or components, 1, 2. They can be rigidly fixed together by the use of bolts 4 (as seen in Figure 1), mortar, glue or welding. If autoblocked joints are used the structure will become more flexible by fitting an elastomer or plastometer between joints as a tightening material. The segments 1, 2 can also be fixed together by capturing their ends 6 in end

slabs 3.

The materials used in the manufacturing of the segments 1, 2 can be of widely varying types such as concrete, reinforced concrete, asbestos cement, PVC, polyester, metals or others. Normally it is preferable that the materials used permit the cost of each segment to be as low as possible.

The areas of the segments that are exposed to strains can conveniently be reinforced in order to optimise the structure and they can also be of variable thickness.

The ends 6 can also conveniently be reinforced and be of variable shape according to the joint, fitting or use.

The mentioned segments can also be of a special shape in order to provide special features or fittings such as inspection holes and man-holes, benches, shelves, steps, flood-discharge means, admittance doors to adjacent conduits, linkings to inflow drain pipes, forks of any type, T junctions, bends etc.

The transverse joints 5 (Figure 10), can be of petticoat type or tongue and groove joints. The joints can be fitted with silicone or epoxide rubber to tighten them or seal them.

As can be seen in the drawings, the pipe may also include bottom slabs 7 and top slabs 8. The slabs connect the sections 1, 2 but hold them spaced apart to increase the size of the pipe bore. The width of these slabs will be fixed in accordance with the hydraulic (or other) necessities or uses of the pipe and can also be moulded or fabricated 'in situ'. The bottom slab 7 can be of special shape, as seen in Figures 4, 5 and 7, and may incorporate, for example, a small conduit 10. This may be formed by post-mounting or may be built at once according to the scope of the project.

The segments may have shelves or supports for cables etc, as shown in Figure 4.

As can be seen from Figure 12, this type of pipe can have a substantially extended transverse section. To achieve this the pipe consists basically of three segments 11, 12 and 13 which can be similar to the elements 1 and 2 previously described. In order to perform this type of assembling there may be used a bottom slab 14 and joints 15 and 16. Alternatively a further element may be fitted between the lower ends of side elements 11 and 12.

If larger sections are needed either more segments or segments with a larger dimension can be used.

Figures 7, 8 and 9 show variant segment shapes. In Figures 7 and 9 the segment shape is not symmetrical about the longitudinal mid-line. In Figure 7 the segments have varying thickness.

The different segments around the circumference of the pipe may be offset longitudinally, so that the transverse joints do not extend continuously around the circumference but instead the transverse joints are positioned alternately, along each side of the pipe. This improves the linearity of the pipe, spreads the strains over the structure and increases the resistence of the whole, without taking away its flexibility for little adjustments to the bed ground. This is shown in Figure 10.

The drain pipe can be installed under earthworks, roads or railways providing that layings are not to take place on the earthworks. Thus, to overcome this, it will be enough to install a metallic shield that allows both the frontal earthmoving and the inside fitting of the segments that make the structure. It is then possible to install culverts of any type without cutting the pavements or causing inconvenience to traffic.

CLAIMS

1. A pipe formed from longitudinally extending curved-section components, each said component extending around a part only of the circumference of the pipe, the pipe having longitudinally extending joints or connections between the components.

2. A pipe according to claim 1, in which the curved section of each said component substantially follows the arc of a circle, each component extending for less than one third of a circle.

3. A pipe according to claim 2, in which adjacent said components around the circumference of the pipe meet at their longitudinal edges.

4. A pipe according to claim 3 in which the said adjacent components are bolted together.

5. A pipe according to claim 3, in which the longitudinal edges of said adjacent components are held together by being captured in a longitudinally extending connection block.

6. A pipe according to any one of claims 3 to 5 in which there is a layer of elastomeric material or of a plastics material between the said adjacent components where they meet.

7. A pipe according to claim 1 or claim 2 in which connecting blocks hold adjacent said components spaced apart.

8. A pipe according to any one of the preceding claims in which there are two said components around the circumference of the pipe.

9. A pipe according to any one of the preceding claims in which the said components at a longitudinal position along the pipe are longitudinally offset with respect to each other, so that the joints between longitudinally successive components do not extend continuously round an entire circumference of the pipe.

10. A pipe according to any one of the preceding claims in which at least some of the components have shelves or other support means on their radially inner surfaces.

11. A pipe according to any one of the preceding claims in which at least some of the said components are reinforced at areas of anticipated stress.

12. A longitudinally extending curved-section pipe component for use in a pipe according to any one of the preceding claims.

13. A pipe component according to claim 12, in which the radially outer and radially inner faces conform sufficiently for a plurality of such components to be stacked.

14. A pipe substantially as herein described with reference to the accompanying drawings.

15. A pipe component substantially as herein

described with reference to the accompanying drawings.

Printed in the UK for HMSO, D8818935, 9/86, 7102.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.